

REMARKS

Applicants have: (a) amended claims 1, 6-9, 11, 13-14, 16, 21-22, and 25; and (b) added claims 27-32 to clarify language, to define the present invention more clearly, and to correct inadvertent errors. Applicants respectfully submit that these amendments place the case in condition for allowance.

Examiner objected to the drawings. In particular, the Examiner stated:

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, a plurality of holding arms as recited in claim 15 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Applicants respectfully submit that the Examiner is wrong when the Examiner asserts that claim 15 recites a plurality of holding arms. As such, Applicants respectfully submit there is no reason to submit a proposed drawing or amend claim 15. In light of the above, Applicants respectfully request that the Examiner withdraw this objection.

Examiner rejected claims 1 and 4 under 35 U.S.C. 102(e). In particular, the Examiner stated:

Claims 1 and 4 are rejected under 35 U.S.C. 102(e) as being anticipated by US Pat No 5,811,803 issued to Komatsu et al.

Komatsu et al discloses a specimen (8) housing as stage (9) therein and connected to a vacuum pump (13) (col. 3, lines 38-41).

Komatsu et al discloses a load lock for loading a specimen into said specimen chamber (8) (Col. 1, lines 10-24).

Komatsu et al discloses a minicolumn (5) and mini-environment housing said minicolumn separate from said specimen chamber (col. 6 lines 1-10).

As per claim 4, Komatsu discloses said mini-environment having an evacuation outlet to pump (12) (see fig. 1).

Applicants have amended claim 1 to correct an inadvertent error. As such, Applicants respectfully traverse the Examiner's rejection.

Applicants respectfully submit that the disclosure of Komatsu et al. is completely different from claims 1 and 4 because, among other things, Komatsu et al. does not teach or

disclose a minicolumn, and Komatsu et al. does not teach or disclose a mini-environment that houses a minicolumn. Instead, Komatsu et al. teaches the use of a thin film disposed at the end of a conventional electron column (which end is disposed in a specimen chamber) to prevent contaminants formed in the specimen chamber from entering the column.

Regarding claim 1: Applicants respectfully submit that the definition of a minicolumn one ought to use in construing the claims is found in the specification. For example, as described in the specification at p. 2, lines 10-22 and shown in FIG. 2, a minicolumn includes an electron source, an aperture, and lens arrangements, i.e., a column houses the electron source and all the necessary electron optics.

In light of the definition provided in the specification and set forth above, Applicants respectfully submit that the Examiner is mistaken in asserting that electron optical column 5 of Komatsu et al. is a minicolumn. As defined in Komatsu et al. at col. 3, lines 21-26: “... the electron microscope comprises: an electron gun 1; a lens system; a electron optical column 5 for allowing the electron beams controlled by the lens system to pass therethrough; ...” Thus, according to the definition provided in Komatsu et al., electron optical column 5 is merely a pipe through which electrons travel.

Applicants respectfully submit that the definition provided in Komatsu et al. ought to be compared with the definition of an electron column given in the specification at p. 1, lines 19-21 as follows: “The column 50 houses the electron source and all the necessary electron optics ...” In addition, Applicants respectfully submit that when these two definitions are compared, there can be no doubt that electron optical column 5 is merely a pipe through which electrons travel and not an electron column, let alone a minicolumn. In fact, there is nothing in Komatsu et al. to indicate by size that the electron microscope disclosed therein includes a minicolumn.

Finally, the electron microscope of Komatsu et al., as shown in FIG. 1 and described at col. 3, lines 19-30, when viewed in light of the definition provided in the specification and set forth above, includes an electron column that includes electron gun 1, condenser lens 2, deflection lens 3, objective lens 4, and electron optical column 5. Applicants respectfully submit that when the electron microscope of Komatsu et al. is properly viewed in

this manner, the Examiner can readily appreciate that the electron column of Komatsu et al. is not housed in a min-environment. In fact, the electron column of Komatsu et al. is not housed in any type of environment. As such, Applicants respectfully submit that claim 1 is not anticipated by Komatsu et al.

Regarding claim 4: Applicants respectfully submit that claim 4 depends from claim 1, and as such, is not anticipated by Komatsu et al. for the same reasons set forth above with respect to claim 1. In addition, Applicants respectfully submit that Komatsu et al. does not anticipate claim 4 for the further reason that Komatsu et al. does not disclose a mini-environment having an evacuation outlet as required by claim 4. In particular, Applicants respectfully submit that the Examiner is wrong when the Examiner asserts that Komatsu et al. discloses a mini-environment having an evacuation outlet to pump 12 since Komatsu et al. does not disclose a mini-environment it merely discloses electron optical column 5 of a conventional electron column having an evacuation outlet to pump 12.

In light of the above, Applicants respectfully request that the Examiner withdraw this rejection.

Examiner rejected claims 12-13 under 35 U.S.C. 102(b). In particular, the Examiner stated:

Claims 12-13 are rejected under 35 U.S.C. 102(b) as being anticipated by US Pat No 5,229,607 issued to Matsui et al.

Matsui et al teaches a main vacuum chamber (17) connected to a vacuum pump (21,22) (col. 8, lines 14-25) and housing a X-Y-Z stage (4) (col. 5, lines 4-7); a holding arm (2) (see Fig. 9; col. 11, lines 51-59); a minicolumn (1) attached to said holding arm.

As per claim 13, Matsui et al teaches a radial pivot (227,228) (see col. 11, lines 51-56).

Applicants have amended claim 13 to correct an inadvertent error. As such, Applicants respectfully traverse the Examiner's rejection.

Regarding claim 12: Applicants respectfully submit that Matsui et al. does not anticipate claim 12 because claim 12 requires a vacuum chamber housing a turntable, and Matsui et al. does not teach or suggest a turntable. The Examiner points out that Matsui et al. discloses an X-Y-Z stage (4) at col. 5, lines 4-7. However, Applicants respectfully submit that an X-Y-Z

stage is not a turntable. As such, Applicants respectfully submit that claim 12 is not anticipated by Matsui et al.

Regarding claim 13: Applicants respectfully submit that claim 13 which depends from claim 12 is not anticipated by Matsui et al. for the same reasons set forth above with respect to claim 12. In addition, Applicants respectfully submit that Matsui et al. does not anticipate claim 13 for the further reason that Matsui et al. does not disclose a radial arm as required by claim 13. In particular, Applicants respectfully submit that the Examiner is wrong when the Examiner asserts that Matsui et al. discloses a radial arm as radial pivot (227, 228) since, unlike a radial arm, the radial pivot (227, 228) disclosed in Matsui et al. merely changes the angular tilt of the electron beam source.

In light of the above, Applicants respectfully request that the Examiner withdraw this rejection.

Examiner rejected claims 1, 5-8, 11, 18 and 21 under 35 U.S.C. 103(a). In particular, the Examiner stated:

Claims 1, 5-8, 11, 18 and 21 are rejected under 35 U.S.C. 103(a) as unpatentable over US Pat No. 5,399,860 issued to Miyoshi and in view of JP Document 40411684 issued to Ito et al.

Miyoshi teaches an electron microscope having a main vacuum chamber (40) housing a stage (42) therein.

Miyoshi teaches a minicolumn (10) positioned inside said main chamber (40) (col. 6, lines 37-68; fig. 3). Miyoshi teaches said minicolumn (10) having a mini-environment defined housing (10a) (see col. 4, lines 38-45).

Miyoshi does not teach a load lock for loading a specimen into said main chamber.

However, Ito et al teaches a main vacuum chamber (14) housing stage (20) therein and connected to a vacuum pump (see fig. 2).

Ito et al discloses a load lock(18) for loading a specimen into said chamber (see abstract).

It would have been obvious to an ordinary artisan to incorporate the teachings of Ito into Miyoshi since Ito teaches the ability to easily obtain SEM image of cut face of a sample (see abstract).

As per claim 5, Ito et al discloses a second chamber (18) having an associated valve for hermetically sealing the opening between the said second chamber (18) and sample chamber (14) (see fig. 2).

As per claim 8, Miyoshi teaches mounting said minicolumn (10) to a stationary platen (52) (i.e. back plate) (col. 6, lines 50-65).

As per claim 11, Miyoshi teaches a vacuum pump (34) situated inside said minicolumn (10) (see col. 6, lines 14-30).

As per claims 18 and 21, Miyoshi teaches a plurality of minicolumns (col. 7, lines 34-44).

Applicants have amended claims 1, 6-8, 11, and 21 to clarify language, to define the present invention more clearly, and to correct inadvertent errors. As such, Applicants respectfully traverse the Examiner's rejection.

Regarding claim 1: The Examiner has asserted that Miyoshi et al. teaches a minicolumn disposed inside a mini-environment. As support for this assertion the Examiner points to col. 4, lines 38-45 of Miyoshi et al. Applicants respectfully submit that the Examiner is wrong, and that Miyoshi et al. does not teach or suggest a mini-environment that houses a minicolumn. Applicants respectfully submit that specification defines an electron column as follows at p.1, lines 19-21 "The column 50 houses the electron source and all the necessary electron optics ..." Further, the specification defines a minicolumn at p. 2, lines 10-19 in conjunction with FIG. 2 as including an electron source, an aperture, and lens arrangements. In light of this, Applicants respectfully submit that the Examiner is incorrect when the Examiner points to 10a in FIG. 1A of Miyoshi et al. as being a mini-environment since 10A (properly viewed in light of the definition of a minicolumn taken from the specification) is not a mini-environment but is merely a casing for column 10. In fact, Miyoshi et al. itself recognizes that 10a is merely a case for electron optic column 10, see col. 4, lines 38-44. Thus, even if the Applicants were to agree with the Examiner that Miyoshi et al. discloses a minicolumn (it does not), Applicants respectfully submit that Miyoshi et al. does not disclose a mini-environment, and as such, Miyoshi et al. does not disclose a minicolumn that is housed in a mini-environment.

Further, even if one were to combine the teaching of Ito et al. to add the load lock to the teaching of Miyoshi et al., one would still not arrive at claim 1 since there is no teaching or suggestion in either Miyoshi et al. or in Ito et al. for enclosing a minicolumn in a mini-environment. As such, Applicants respectfully submit that claim 1 is patentable over Miyoshi et al. in view of Ito et al.

Regarding claim 5: Applicants respectfully submit that claim 5 depends from claim 1, and as such, Applicants respectfully submit that claim 5 is patentable over Miyoshi et al. in view of Ito et al. for the same reasons set forth above with respect to claim 1.

In addition, the Examiner cites Ito et al. as disclosing a second chamber (18) having a valve for hermetically sealing an opening between the second chamber and sample chamber (14). The second chamber referred to in Ito et al. is a load lock chamber. Applicants respectfully submit that the load lock chamber of Ito et al. is completely different from the chamber of a mini-environment of claim 5. In particular, the mini-environment of claim 5 houses a minicolumn, whereas the load lock chamber of Ito et al. does not house a minicolumn or any type of column. Further, Applicants respectfully submit that even if one were to combine the teaching of Ito et al. with Miyoshi et al. one would not arrive at the invention of claim 5 since there is no teaching or suggestion in either of the references for housing a column of any kind in a mini-environment. As such, Applicants respectfully submit that claim 5 is patentable over Miyoshi et al. in view of Ito et al.

Regarding claim 6: Applicants respectfully submit that claim 6 depends from claims 1 and 5, and as such, Applicants respectfully submit that claim 6 is patentable over Miyoshi et al. in view of Ito et al. for the same reasons set forth above with respect to claims 1 and 5.

In addition, Applicants respectfully submit that claim 6 requires a valve that comprises a sealing plate that is pivoted on a shaft, which shaft is capable of elevation motion. Applicants respectfully submit that neither Miyoshi et al. nor Ito et al. teaches, hints or suggests, in any manner whatsoever, a valve that comprises a sealing plate that is pivoted on a shaft, which shaft is capable of elevation motion. As such, Applicants respectfully submit that claim 6 is patentable over Miyoshi et al. in view of Ito et al.

Regarding claim 7: Applicants respectfully submit that Miyoshi et al. teaches away from claim 7 which requires that a minicolumn is non-translatably positioned inside a main chamber. In particular, Miyoshi et al. teaches that an electron optical column can be weight-reduced and size-reduced so that it can be moved in a horizontal direction while a sample table is fixed or moved, see Miyoshi et al. at col. 6, lines 24-30; col. 6, line 62 to col. 7, line 2; and col. 7, lines 46-57. As such, Applicants respectfully submit that claim 7 is patentable over Miyoshi et al. in view of Ito et al.

Regarding claim 8: Applicants respectfully submit that claim 8 depends from claim 7, and as such, Applicants respectfully submit that claim 8 is patentable over Miyoshi et al. in view of Ito et al. for the same reasons set forth above with respect to claim 7.

In addition, Applicants respectfully submit that the Examiner is wrong when the Examiner asserts that stationary platen 52 shown in FIG. 3 and described at col. 6, lines 51-61 of Miyoshi et al. is a removable back plate required by claim 8. As shown in the specification on p. 7 and at FIG. 5A, a removable back plate provides access into the main chamber. As set forth at p. 7, lines 16-18 of the specification: "Here again, it is preferred that the minicolumn be attached to a back plate 560, so that removal of the back plate 560 would remove the minicolumn 500 as well." As the Examiner can readily appreciate from this, stationary platen 52 disclosed in Miyoshi et al. is not a removable back plate of the main chamber. Thus, Applicants respectfully submit that neither Miyoshi et al. nor Ito et al. teaches, hints or suggests a chamber having a removable back plate that houses a minicolumn, which minicolumn is connected to the removable back plate. As such, Applicants respectfully submit that claim 8 is patentable over Miyoshi et al. in view of Ito et al.

Regarding claim 11: Applicants respectfully submit that claim 11 depends from claim 7, and as such, Applicants respectfully submit that claim 11 is patentable over Miyoshi et al. in view of Ito et al. for the same reasons set forth above with respect to claim 7.

In addition, the Examiner asserts that Miyoshi et al teaches a vacuum pump situated inside a minicolumn. However, Applicants respectfully submit that this is irrelevant since claim 11 requires that the vacuum pump be situated inside the main vacuum chamber but external to the minicolumn. As the Examiner can readily appreciate, placement of the vacuum pump inside a column in accordance with the teaching of Miyoshi et al. disadvantageously increases the size of the column to such an extent that it may not be able to be a minicolumn. As such, Applicants respectfully submit that claim 11 is patentable over Miyoshi et al. in view of Ito et al.

Regarding claim 18: Applicants respectfully submit that neither Miyoshi et al. nor Ito et al. teaches or suggests in any manner whatsoever an electron microscope including a mini-environment housing a plurality of minicolumns. In particular, Applicants respectfully

submit that neither Miyoshi et al. nor Ito et al. teaches or suggests in any manner whatsoever using a mini-environment to house even a single minicolumn, see the arguments set forth above with respect to claim 1. As such, Applicants respectfully submit that claim 18 is patentable over Miyoshi et al. in view of Ito et al.

Regarding claim 21: Applicants respectfully submit that Miyoshi et al. teaches away from claim 21 which requires that a plurality of minicolumns are non-translatably positioned inside a main chamber. In particular, Miyoshi et al. teaches that an electron optical column can be weight-reduced and size-reduced so that it can be moved in a horizontal direction while a sample table is fixed or moved, see Miyoshi et al. at col. 7, lines 46-57. As such, Applicants respectfully submit that claim 21 is patentable over Miyoshi et al. in view of Ito et al.

In light of the above, Applicants respectfully request that the Examiner withdraw this rejection.

Examiner rejected claims 2-3, 9-10, 19-20 and 22-23 under 35 U.S.C. 103(a). In particular, the Examiner stated:

Claims 2-3, 9-10, 19-20 and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyoshi and Ito as applied to claims 7 and 21 above, and further in view of US Pat No 5,229,607 issued to Matsui et al.

The obvious combination of Miyoshi and Ito has been discussed except for tilted minicolumn(s); extracting a minicolumn and a bellow structure.

However, Matsui et al discloses an additional tilt-able minicolumn situated inside a main chamber (204) (fig. 9; col. 11, lines 45-59).

In addition, Matsui et al teaches a x-y-z mechanism for moving the minicolumn (1) and a bellow structure (109) to facilitate said movement of the minicolumn (col. 6, lines 40-58).

It would have been obvious to an ordinary artisan to incorporate the teachings of Matsui into the obvious combination of Miyoshi and Ito since Matsui teaches the ability of monitoring the localized processes (col. 11, lines 38-44).

As per claims 10 and 23, Matsui et al teaches varying the tilt (col. 11, lines 51-59).

Applicants have amended claims 9 and 22 to clarify language, to define the present invention more clearly, and to correct inadvertent errors. As such, Applicants respectfully traverse the Examiner's rejection.

Regarding claim 2: Claim 2 depends from claim 1, and Applicants respectfully submit that, as has been discussed above with respect to claim 1, neither Miyoshi et al. nor Ito et al. teaches or suggests in any manner whatsoever enclosing a minicolumn in a mini-environment. In addition, Applicants respectfully submit that, referring to FIG. 4 and col. 6, lines 40-58 of Matsui et al., Matsui et al. also does not teach enclosing a minicolumn in a mini-environment. In further addition, Applicants respectfully submit that there is no teaching or suggestion in Miyoshi et al., Ito et al. or Matsui et al. to enclose a minicolumn in a mini-environment having an opening for introducing and extracting the minicolumn into and from a main chamber, respectively, as required by claim 2. As such, Applicants respectfully submit that claim 2 is patentable over Miyoshi et al. in view of Ito et al and further in view of Matsui et al.

Regarding claim 3: Claim 3 depends from claim 1, and Applicants respectfully submit that, as has been discussed above with respect to claim 1, neither Miyoshi et al. nor Ito et al. teaches or suggests in any manner whatsoever enclosing a minicolumn in a mini-environment. In addition, Applicants respectfully submit that although Matsui et al. teaches the use of a bellows to attach an SEM tube to a flange mounted at an opening of a vacuum wall, this provides no teaching or suggestion for a mini-environment that uses a bellows structure for introducing and extracting a minicolumn into and from a main chamber, respectively, as required by claim 3. In particular, this is the case because there is no teaching or suggestion in Miyoshi et al., Ito et al. or Matsui et al. to house a minicolumn in a mini-environment. As such, Applicants respectfully submit that claim 3 is patentable over Miyoshi et al. in view of Ito et al and further in view of Matsui et al.

Regarding claim 9: Claim 9 depends from claim 7, and Applicants respectfully submit that, as has been discussed above with respect to claim 7, Miyoshi et al. teaches away from claim 9 which requires that a minicolumn is non-translatable positioned inside a main chamber. In particular, Miyoshi et al. teaches that an electron optical column can be weight-reduced and size-reduced so that it can be moved in a horizontal direction while a sample table is fixed or moved, see Miyoshi et al. at col. 6, lines 24-30; col. 6, line 62 to col. 7, line 2; and col. 7, lines 46-57. In addition, Applicants respectfully submit that Matsui et al. also teaches away from claim 9 by teaching the use of a movable column, see Matsui et al. at col. 12, lines 37-50. As

such, Applicants respectfully submit that claim 9 is patentable over Miyoshi et al. in view of Ito et al and further in view of Matsui et al.

Regarding claim 10: Applicants respectfully submit that claim 10 depends from claim 9, and as such, Applicants respectfully submit that claim 10 is patentable over Miyoshi et al. in view of Ito et al. and Matsui et al. for the same reasons set forth above with respect to claim 9. As such, Applicants respectfully submit that claim 10 is patentable over Miyoshi et al. in view of Ito et al and further in view of Matsui et al.

Regarding claim 19: Applicants respectfully submit that, as has been discussed above with respect to claim 1, neither Miyoshi et al. nor Ito et al. teaches or suggests in any manner whatsoever enclosing one minicolumn, let alone a plurality of minicolumns, in a mini-environment. In addition, Applicants respectfully submit that, referring to FIG. 4 and col. 6, lines 40-58 of Matsui et al., Matsui et al. also does not teach enclosing a plurality of minicolumns in a mini-environment. In further addition, Applicants respectfully submit that there is no teaching or suggestion in Miyoshi et al., Ito et al. or Matsui et al. to enclose a plurality minicolumns in a mini-environment having an opening for introducing and extracting the minicolumns into and from a main chamber, respectively, as required by claim 19. As such, Applicants respectfully submit that claim 19 is patentable over Miyoshi et al. in view of Ito et al and further in view of Matsui et al.

Regarding claim 20: Applicants respectfully submit that, as has been discussed above with respect to claim 1, neither Miyoshi et al. nor Ito et al. teaches or suggests in any manner whatsoever enclosing a minicolumn or a plurality of minicolumns in a mini-environment. In addition, Applicants respectfully submit that, referring to FIG. 4 and col. 6, lines 40-58 of Matsui et al., Matsui et al. also does not teach enclosing a minicolumn or a plurality of minicolumns in a mini-environment.

In further addition, Applicants respectfully submit that although Matsui et al. teaches the use of a bellows to attach an SEM tube to a flange mounted at an opening of a vacuum wall, this provides no teaching or suggestion for a mini-environment that uses a bellows structure for introducing and extracting a plurality of minicolumns into and from a main chamber, respectively, as required by claim 20. In particular, this is the case because there is no

teaching or suggestion in Miyoshi et al., Ito et al. or Matsui et al. to enclose a minicolumn or a plurality of minicolumns in a mini-environment. As such, Applicants respectfully submit that claim 20 is patentable over Miyoshi et al. in view of Ito et al and further in view of Matsui et al.

Regarding claim 22: Claim 22 depends from claim 21, and Applicants respectfully submit that, as has been discussed above with respect to claim 21, Miyoshi et al. teaches away from claim 21 which requires that a plurality of minicolumns are non-translatable positioned inside a main chamber. In particular, Miyoshi et al. teaches that an electron optical column can be weight-reduced and size-reduced so that it can be moved in a horizontal direction while a sample table is fixed or moved, see Miyoshi et al. at col. 6, lines 24-30; col. 6, line 62 to col. 7, line 2; and col. 7, lines 46-57. In addition, Applicants respectfully submit that Matsui et al. also teaches away from claim 22 by teaching the use of a movable column, see Matsui et al. at col. 12, lines 37-50. As such, Applicants respectfully submit that claim 22 is patentable over Miyoshi et al. in view of Ito et al and further in view of Matsui et al.

Regarding claim 23: Applicants respectfully submit that claim 23 depends from claim 22, and as such, Applicants respectfully submit that claim 23 is patentable over Miyoshi et al. in view of Ito et al. and Matsui et al. for the same reasons set forth above with respect to claim 22. As such, Applicants respectfully submit that claim 23 is patentable over Miyoshi et al. in view of Ito et al and further in view of Matsui et al.

In light of the above, Applicants respectfully request that the Examiner withdraw this rejection.

Examiner rejected claims 14-17 and 24-26 under 35 U.S.C. 103(a). In particular, the Examiner stated:

Claims 14-17 and 24-26 are rejected under 35 U.S.C. 103(a) as unpatentable over Matsui ('607).

Matsui et al teaches a mini-column attached to a holding arm structure (col. 11, lines 50-59). Matsui, also teaches a plurality of mini-columns.

Matsui does not explicitly teach a plurality of mini-columns attached to said holding arm structure.

However, an ordinary artisan would have found it obvious to extend the holding arm structure depicted in fig. 9 to accommodate the additional SEM tube shown in fig. 11 since Matsui teaches arranging said minicolumn(s) along a circular arc (col. 12, lines 51-59).

Applicants have amended claims 14, 16, and 25 to clarify language, to define the present invention more clearly, and to correct inadvertent errors. Applicants respectfully traverse the Examiner's rejection.

Regarding claims 14-17: Applicants respectfully submit that claims 14-16 all depend from claim 12 which requires a vacuum chamber housing a turntable. Applicants respectfully submit that Matsui et al. does teach or suggest a turntable in any manner whatsoever. As such, Applicants respectfully submit that claims 14-17 are patentable over Matsui et al.

Regarding claims 24-26: Applicants respectfully submit that claims 25-26 both depend from claim 24 which requires a vacuum chamber housing a turntable. Applicants respectfully submit that Matsui et al. does teach or suggest a turntable in any manner whatsoever. As such, Applicants respectfully submit that claims 24-26 are patentable over Matsui et al.

In light of the above, Applicants respectfully request that the Examiner withdraw this rejection.

Examiner stated:

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Pat No. 4,706,019 issued to Richardson and US Pat No 4,864,228 issued to Richardson.

Richardson ('019) teaches an electron microscope having a mini-column (29) having a mini-column (col. 7, lines 45-48).

Richardson ('228) teaches an electron microscope having a mini-column in a mini-environment (see fig. 12).

Applicants have reviewed the prior art of record and not relied upon and consider that prior art to be no more pertinent than the prior art discussed above.

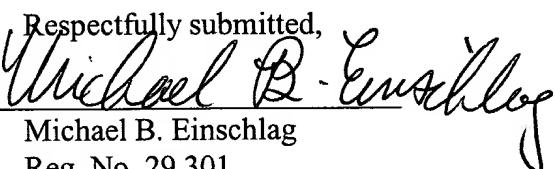
Applicants have added claims 27-32, and Applicants respectfully submit that these new claims are patentable over the cited prior art for the reasons set forth above with respect to claims 1-26.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "Version with markings to show changes made."

In light of the above, Applicants respectfully submit that all the remaining claims are allowable, and Applicants respectfully request that the Examiner reconsider the case and pass the case to issue. Should the Examiner have any questions or wish to discuss any aspect of the application, a telephone call to the undersigned would be welcome.

Respectfully submitted,

By:



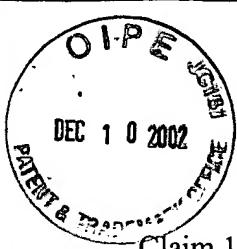
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Claim 1 has been amended as follows:

1. (Twice Amended) An electron microscope, comprising:
a main vacuum chamber housing a stage therein and connected to a vacuum pump;
a load lock for loading a specimen into said main vacuum chamber;
a minicolumn; and,
a mini-environment housing said minicolumn.
2. (Not Amended) The electron microscope of claim 1, wherein said mini-environment comprises an opening to the main chamber for introducing said minicolumn into the main vacuum chamber and extracting said minicolumn from said main vacuum chamber.
3. (Not Amended) The electron microscope of claim 1, wherein said mini-environment comprises a bellows structure for introducing said minicolumn into the main vacuum chamber and extracting said minicolumn from said main vacuum chamber.
4. (Not Amended) The electron microscope of claim 1, wherein said mini-environment comprises an evacuation outlet.
5. (Not Amended) The electron microscope of claim 1, wherein said mini-environment comprises a second chamber having an opening into said main chamber, and a valve structure for hermetically sealing said opening.

Claim 6 has been amended as follows:

6. (Amended) The electron microscope of claim 5, wherein said valve comprises a sealing plate that is pivoted on a shaft, which shaft is capable of elevation motion [anchored to a pivot and movable in the Z-direction].

Claim 7 has been amended as follows:

7. (Twice Amended) An electron microscope, comprising:
a main vacuum chamber housing a stage therein and connected to a vacuum pump;
a load lock for loading a specimen into said main vacuum chamber; and
a minicolumn non-translatably positioned inside said main chamber.

Claim 8 has been amended as follows:

8. (Amended) The electron microscope of claim 7, further comprising a removable back plate attached to said main chamber, and wherein said minicolumn is connected to the removable back plate.

Claim 9 has been amended as follows:

9. (Twice Amended) The electron microscope of claim 7, further comprising at least one tilted minicolumn situated inside said main vacuum chamber at a tilt with respect to [the minicolumn] a perpendicular to a surface of the stage.

10. (Not Amended) The electron microscope of claim 9, wherein the tilt is variable.

Claim 11 has been amended as follows:

11. (Amended) The electron microscope of claim 7, further comprising a vacuum pump situated inside the main vacuum chamber and external to and connected to the minicolumn.

12. (Not Amended) An electron microscope, comprising:
a main vacuum chamber connected to a vacuum pump and housing;
a turntable stage;
a holding arm; and,
a minicolumn attached to said holding arm.

Claim 13 has been amended as follows:

13. (Amended) The electron microscope of claim 12, further comprising a radial pivot, and wherein said holding arm is connected to said radial pivot.

Claim 14 has been amended as follows:

14. (Amended) The electron microscope of claim 12, further comprising a linear motion carriage, and wherein said holding arm is connected to said linear motion carriage.

15. (Not Amended) The electron microscope of claim 12, further comprising at least one additional minicolumn connected to said holding arm.

Claim 16 has been amended as follows:

16. (Amended) The electron microscope of claim 15, wherein said at least one additional minicolumn has a tilt with respect to [the minicolumn] a perpendicular to a surface of the turntable stage.

17. (Not Amended) The electron microscope of claim 16, wherein the tilt is variable.

18. (Not Amended) An electron microscope, comprising:
a main vacuum chamber housing a stage therein and connected to a vacuum pump;

a load lock for loading a specimen into said main vacuum chamber;
a plurality of minicolumns; and
a mini-environment housing said minicolumns.

19. (Not Amended) The electron microscope of claim 18, wherein said mini-environment comprises an opening to the main chamber for introducing said minicolumns into the main vacuum chamber and extracting said minicolumns from said main vacuum chamber.

20. (Not Amended) The electron microscope of claim 18, wherein said mini-environment comprises a bellows structure for introducing said minicolumns into the main vacuum chamber and extracting said minicolumns from said main vacuum chamber.

Claim 21 has been amended as follows:

21. (Amended) An electron microscope comprising:
a main vacuum chamber housing a stage therein and connected to a vacuum pump;
a load lock for loading a specimen into said main vacuum chamber; and
a plurality of minicolumns non-translatable positioned inside said main chamber.

Claim 22 has been amended as follows:

22. (Amended) The electron microscope of claim 21, wherein at least one of said minicolumns is situated inside the main vacuum chamber at a tilt with respect to [the other minicolumns] a perpendicular to a surface of the stage.

23. (Not Amended) The electron microscope of claim 22, wherein the tilt is variable.

24. (Not Amended) An electron microscope, comprising:
a main vacuum chamber connected to a vacuum pump and housing;
a turntable stage;
a holding arm; and,
a plurality of minicolumns attached to said holding arm.

Claim 25 has been amended as follows:

25. (Amended) The electron microscope of claim 24, wherein at least one of said minicolumns has a tilt with respect to [the other minicolumns] a perpendicular to a surface of the stage.

26. (Not Amended) The electron microscope of claim 25, wherein said tilt is variable.

Please add the following claims:

27. The electron microscope of claim 1 wherein the mini-environment further comprises a back plate.

28. The electron microscope of claim 27 wherein the minicolumn is connected to the back plate.

29. The electron microscope of claim 5 wherein the mini-environment further comprises a back plate.

30. The electron microscope of claim 29 wherein the minicolumn is connected to the back plate.

31. The electron microscope of claim 7 wherein the minicolumn is disposed at a tilt with respect to a perpendicular to a surface of the stage.

32. The electron microscope of claim 31 wherein the tilt is variable.